

Daniel Kahne
Professor of Chemistry and Chemical Biology, Harvard University
Professor of Biological Chemistry and Molecular Pharmacology, Harvard Medical School

Address: Harvard University
Department of Chemistry and Chemical Biology
12 Oxford Street
Cambridge, MA 02138

Email: kahne@chemistry.harvard.edu
Phone: 617-496-0208
Fax: 617-496-0215

Date of Birth: August 20, 1959

Education: Postdoctoral Fellow 1986-1988, Columbia University, with Professor W. Clark Still
Ph.D. 1986, Columbia University, with Professor Gilbert Stork
A.B. 1981, Cornell University

Professional: Professor of Chemistry and Chemical Biology, Harvard University, Professor of Biological Chemistry and Molecular Pharmacology, Harvard Medical School, July 2004-Present
A. Barton Hepburn Professor of Organic Chemistry, Princeton University, 2000-2004
Professor of Chemistry, Princeton University, 1994-2000
Associate Professor of Chemistry, Princeton University, 1991-1994
Assistant Professor of Chemistry, Princeton University, 1988-1991

Honors: Wilson Prize, Harvard University, 1999
Arthur C. Cope Scholar Award, ACS Division of Organic Chemistry, 1996
Merck Young Investigator Award, Merck Research Laboratories, 1995
Horace S. Isbell Award, ACS Division of Carbohydrate Chemistry, 1995
Arun Guthikonda Memorial Award, Columbia University, 1994
Fuson Visiting Professor, University of Illinois, 1993
Alfred P. Sloan Research Fellow, 1992-1994
ICI Pharmaceuticals Excellence in Chemistry Award, 1992
NSF Presidential Young Investigator, 1990-1995
Lilly Grantee, 1990-1992
ONR Young Investigator, 1989-1991
Searle Scholar, 1989-1991

Publications:

Crystallographic Analysis of an 8-mer p53 Peptide Analogue Complexed with MDM2. K. Sakurai, C. Schubert, D. Kahne, *J Am Chem Soc* **2006** (submitted).

Installation of the Pyrrolyl-2-carboxyl Pharmacophore by CouN1 and CouN7 in the Late Biosynthetic Steps of the Aminocoumarin Antibiotics Clorobiocin and Coumermycin A₁. S. Garneau-Tsodikova, A. Stapon, D. Kahne, C.T. Walsh, *Biochemistry* **2006** (in press).

Advances in Understanding Bacterial Outer-membrane Biogenesis. T.J. Silhavy, N. Ruiz, D. Kahne, *Nat Rev Microbiol* **2006**. 4, 57-66.

In Vitro Reconstitution of EryCIII Activity for the Preparation of Unnatural Macrolides. Y. Yuan, H.S. Chung, C. Leimkuhler, C.T. Walsh, D. Kahne, S. Walker, *J Am Chem Soc* **2005**. 127, 14128-14129.

A Systematic Investigation of the Synthetic Utility of Glycopeptide Glycosyltransferases. M. Oberthur, C. Leimkuhler, R.G. Kruger, W. Lu, C.T. Walsh, D. Kahne, *J Am Chem Soc* **2005**. 127, 10747-10752.

AknT Is an Activating Protein for the Glycosyltransferase AknS in L-Aminodeoxysugar Transfer to the Aglycone of Aclacinomycin A. W. Lu, C. Leimkuhler, G.J. Gatto Jr., R.G. Kruger, M. Oberthur, D. Kahne, C.T. Walsh, *Chem Biol*. **2005**. 12, 527-534.

Characterization of the Aminocoumarin Ligase SimL from the Simocyclinone Pathway and Tandem Incubation with NovM,P,N from the Novobiocin Pathway. M. Pacholec, C.L. Freel Meyers, M. Oberthur, D. Kahne, C.T. Walsh, *Biochemistry* **2005**, 44, 4949-4956.

Chemical Conditionality: A Genetic Strategy to Probe Organelle Assembly. N. Ruiz, B. Falcone, D. Kahne, T.J. Silhavy, *Cell* **2005**, 121, 307-317.

Identification of a Multi-Component Complex Required for Outer Membrane Biogenesis in *Escherichia coli*. T. Wu, J. Malinverni, N. Ruiz, S. Kim, T.J. Silhavy, D. Kahne, *Cell* **2005**, 121, 235-246.

Differential Inhibition of *S. aureus* PBP2 by Glycopeptide Antibiotics. C. Leimkuhler, L. Chen, D. Barrett, G. Panzone, B. Sun, B. Falcone, S. Donadio, S. Walker, D. Kahne, *J Am Chem Soc* **2005**, 127, 3250-3251.

Glycopeptide and Lipoglycopeptide Antibiotics. D. Kahne, C. Leimkuhler, W. Lu, C.T. Walsh, *Chem Rev.* **2005**, 105, 425-448.

Tailoring of Glycopeptide Scaffolds by the Acyltransferases from the Teicoplanin and A-40,926 Biosynthetic Operons. R. G. Kruger, W. Lu, M. Oberthuer, J. Tao, D. Kahne and C. T. Walsh, *Chem. Biol.* **2005**, 12, 131-140.

Glycosylation of Glycopeptides: A Comparison of Chemoenzymatic and Chemical Methods. C. Leimkuhler, Z. Chen, R. Kruger, M. Oberthuer, W. Lu, C.T. Walsh and D. Kahne, *Tetrahedron: Asymmetry* **2005**, 16, 599-603.

Comparison of Antigen Constructs and Carrier Molecules for Augmenting the Immunogenicity of the Monosaccharide Epithelial Cancer Antigen Tn. E. Kagan, G. Ragupathi, S. S. Yi, C. A. Reis, J. Gildersleeve, D. Kahne, H. Clausen, S. J. Danishefsky, P. O. Livingston. *Cancer Immunol Immunother* **2005**, 54, 424-430.

Kinetic Characterization of the Glycosyltransferase Module of *Staphylococcus Aureus* PBP2. D.S. Barrett, C.E. Leimkuhler, L. Chen, D. Walker, D. Kahne and S. Walker, *J Bacteriol* **2004**, 187, 2215-2217.

Use of a Retroinverso p53 Peptide as an Inhibitor of MDM2. K. Sakurai, H.S. Chung and D. Kahne, *J. Am. Chem. Soc.* **2004**, 126, 16288-16289.

Assembly of Dimeric Variants of Coumermycins by Tandem Action of the Four Biosynthetic Enzymes CouL, CouM, CouP and NovN. C. Freel Meyers, M. Oberthuer, L. Heide, D. Kahne and C. Walsh, *Biochemistry* **2004**, 43, 15022-15036.

A Practical Method for the Stereoselective Generation of beta-2-Deoxy Glycosyl Phosphates. M. Oberthuer, C. Leimkuhler and D. Kahne, *Org. Lett.* **2004**, 6, 2873-2876.

Reconstitution and Characterization of a New Desosaminy Transferase, EryCIII, from the Erythromycin Biosynthetic Pathway. H. Lee, H. Chung, C. Hang, C. Koshla, C. Walsh, D. Kahne and S. Walker, *J. Am. Chem. Soc.* **2004**, 126, 9924.

Characterization of NovP and NovN: Completion of Novobiocin Biosynthesis by Sequential Tailoring of the Noviosyl Ring. C. Freel Meyers, M. Oberthuer, H. Xu, L. Heide, D. Kahne and C. Walsh, *Angewandte Chemie* **2004**, 43, 67.

Stochastic Detection of Monovalent and Bivalent Protein-Ligand Interactions. S. Howorka, J. Nam, H. Bayley and D. Kahne, *Angewandte Chemie Int. Ed.* **2004**, 43, 4548.

Characterization of a Regiospecific Epivancosaminy Transferase GtfA and Enzymatic Reconstruction of the Antibiotic Chloroeremomycin. W. Lu, M. Oberthuer, C. Leimkuhler, J. Tao, D. Kahne and C. Walsh, *Proc. Natl Acad. Sci. USA* **2004**, 101, 4390.

AknK Is an L-2-Deoxyfucosyltransferase in the Biosynthesis of the Anthracycline Aclacinomycin A. W. Lu, C. Leimkuhler, M. Oberthuer, D. Kahne and C. Walsh, *Biochemistry* **2004**, *43*, 4548.

Vancomycin Analogues Active Against VanA-Resistant Strains Inhibit Bacterial Transglycosylase Without Binding Substrate. L. Chen, D. Walker, B. Sun, Y. Hu, S. Walker and D. Kahne. *Proc. Natl. Acad. Sci. USA* **2003**, *100*, 5658.

Initial Characterization of Novobiocic Acid Noviosyl Transferase Activity of NovM in Biosynthesis of the Antibiotic Novobiocin. C. Freil Meyers, M. Oberthuer, J. Anderson, D. Kahne and C. Walsh, *Biochemistry* **2003**, *42*, 4179.

Overcoming Degeneracy in Carbohydrate Recognition. A. Basu and D. Kahne, *Angewandte Chemie Int. Ed.* **2003**, *42*, 2504.

Biopolymers: Multifaceted Biopolymers. F. Eckstein, D. Kahne and W. Degrado, *Current Opinion in Chemical Biology* **2002**, *6*, 805.

Incorporation of Glucose Analogs by Glycosyltransferases GtfE and GtfD from the Vancomycin Biosynthetic Pathway to Generate Variant Glycopeptides. H. Losey, J. Jiang, J. Biggins, M. Oberthuer, X. Ye, S. Dong, D. Kahne, J. Thorson and C. Walsh, *Chemistry and Biology* **2002**, *9*, 1305.

Structural Requirements for VanA Activity of Vancomycin Analogues. Z. Chen, U. Eggert, S. Dong, S. Shaw, B. Sun, J. LaTour and D. Kahne, *Tetrahedron* **2002**, *58*, 6585.

The Structural Basis for Induction of VanB Resistance. S. Dong, M. Oberthuer, H. Losey, J. Anderson, U. Eggert, M. Peczuh, C. Walsh and D. Kahne, *J. Am. Chem. Soc.* **2002**, *124*, 9064.

Hybrid Glycopeptide Antibiotics. B. Sun, Z. Chen, U. Eggert, S. Shaw, J. LaTour and D. Kahne, *J. Am. Chem. Soc.* **2001**, *123*, 12722.

Genetic Basis for Activity Differences Between Vancomycin and Glycolipid Derivatives of Vancomycin. U. Eggert, N. Ruiz, B. Falcone, A. Branstrom, R. Goldman, T. Silhavy and D. Kahne, *Science* **2001**, *294*, 361.

Determining Absolute Configuration in Flexible Molecules: A Case Study. K. Specht, J. Nam, D. Ho, N. Berova, R. Kondru, D. Beratan, P. Wipf, R. Pascal, Jr. and D. Kahne, *J. Am. Chem. Soc.* **2001**, *123*, 8961.

Tandem Action of Glycosyltransferases in the Maturation of Vancomycin and Teicoplanin Aglycones: Novel Glycopeptides. H. Losey, M. Peczuh, Z. Chen, U. Eggert, S. Dong, I. Pelczer, D. Kahne and C. Walsh, *Biochemistry* **2001**, *40*, 4745.

Better Substrates for Bacterial Transglycosylases. X. Ye, M. Lo, L. Brunner, D. Walker, D. Kahne and S. Walker, *J. Am. Chem. Soc.* **2001**, *123*, 3155.

The Role of Hydrophobic Substituents in the Biological Activity of Glycopeptide Antibiotics. R. Kerns, S. Dong, S. Fukuzawa, J. Carbeck, J. Kohler, L. Silver and D. Kahne, *J. Am. Chem. Soc.* **2000**, *122*, 12608.

Hydrogen Abstraction on Photolysis of a Naphthocarborane. A. Bradley, A. Link, K. Biswas, D. Kahne, J. Schwartz, M. Jones, Jr., Z. Zhu and M. Platz, *Tetrahedron Letters* **2000**, *41*, 8691.

The Molecular Basis for Pyrimidine-Selective DNA Binding: Analysis of Calicheamicin Oligosaccharide Derivatives by Capillary Electrophoresis. K. Biswas, S. Pal, J. Carbeck and D. Kahne, *J. Am. Chem. Soc.* **2000**, *122*, 8413.

- Calicheamicin-DNA Recognition: An Analysis of Seven Different Drug-DNA Complexes. A. Kalben, S. Pal, A. Andreotti, S. Walker, D. Gange, K. Biswas and D. Kahne, *J. Am. Chem. Soc.* **2000**, *122*, 8403.
- Design of an Oligosaccharide Scaffold That Binds in the Minor Groove of DNA. H. Xuereb, M. Maletic, I. Pelczer, J. Gildersleeve and D. Kahne, *J. Am. Chem. Soc.* **2000**, *122*, 1883.
- Nonstatistical Binding of a Protein to Clustered Carbohydrates. N. Horan, L. Yan, H. Isobe, G. Whitesides and D. Kahne, *Proc. Natl. Acad. Sci. USA* **1999**, *96*, 11782.
- Scavenging Byproducts in the Sulfoxide Glycosylation Reaction: Application to the Synthesis of Ciclamycin. J. Gildersleeve, A. Smith, K. Sakurai, S. Raghavan and D. Kahne, *J. Am. Chem. Soc.* **1999**, *121*, 6176.
- Vancomycin Derivatives that Inhibit Peptidoglycan Biosynthesis Without Binding D-Ala-D-Ala. M. Ge, Z. Chen, H. Onishi, J. Kohler, L. Silver, R. Kerns, S. Fukuzawa, C. Thompson and D. Kahne, *Science* **1999**, *284*, 507.
- Synthesis of Vancomycin from the Aglycon. C. Thompson, M. Ge and D. Kahne, *J. Am. Chem. Soc.* **1999**, *121*, 1237.
- DNA-Binding Glycoconjugates. D. Kahne, D. Silva and S. Walker, *Bioorganic Chemistry: Carbohydrates* Oxford University Press, **1999**, 174.
- Sml₂ Cleavage of Chromomycin A₃ Sugars. K. Specht, C. Harris, G. Molander and D. Kahne, *Tetrahedron Letters* **1999**, *121*, 1237.
- Reconstruction of Vancomycin by Chemical Glycosylation of the Pseudoaglycon. M. Ge, C. Thompson and D. Kahne, *J. Am. Chem. Soc.* **1998**, *120*, 11014.
- Sulfenate Intermediates in the Sulfoxide Glycosylation Reaction. J. Gildersleeve, R. Pascal, Jr. and D. Kahne, *J. Am. Chem. Soc.* **1998**, *120*, 5961.
- Design of Compounds that Increase the Absorption of Polar Molecules. C. Bowe, L. Mokhtarzadeh, P. Venkatesan, S. Babu, H. Axelrod, M. Sofia, R. Kakarla, T. Chan, J. Kim, H. Lee, G. Amidon, S. Choe, S. Walker and D. Kahne, *Proc. Natl. Acad. Sci. USA* **1997**, *94*, 12218.
- Polyvalent Binding to Carbohydrates Immobilized on an Insoluble Resin. R. Liang, J. Loebach, N. Horan, M. Ge, C. Thompson, L. Yan and D. Kahne, *Proc. Natl. Acad. Sci. USA* **1997**, *94*, 10554.
- Combinatorial Approaches to Carbohydrates. D. Kahne, *Current Opinion in Chemical Biology* **1997**, *1*, 130.
- Parallel Synthesis and Screening of a Solid Phase Carbohydrate Library. R. Liang, L. Yan, J. Loebach, M. Ge, Y. Uozumi, K. Sekanina, N. Horan, J. Gildersleeve, C. Thompson, A. Smith, K. Biswas, W. Still and D. Kahne, *Science* **1996**, *274*, 1520.
- Generalizing Glycosylation: Synthesis of the Blood Group Antigens Le^a, Le^b, and Le^x Using a Standard Set of Reaction Conditions. L. Yan and D. Kahne, *J. Am. Chem. Soc.* **1996**, *118*, 9239.
- Cationic Facial Amphiphiles: A Promising Class of Transfection Agents. S. Walker, M. Sofia, R. Kakarla, N. Kogan, L. Wierichs, C. Longley, K. Bruker, H. Axelrod, S. Midha, S. Babu and D. Kahne, *Proc. Natl. Acad. Sci. USA* **1996**, *93*, 1585.
- Sensitivity of Glycopeptide Conformation to Carbohydrate Chain Length. R. Liang, A. Andreotti and D. Kahne, *J. Am. Chem. Soc.* **1995**, *116*, 10395.

p-Methoxybenzyl Ethers as Acid-Labile Protecting Groups in Oligosaccharide Synthesis. L. Yan and D. Kahne, *Synlett* **1995**, 523.

Strategies for the Design of Minor Groove Binders: A Re-Evaluation Based on the Emergence of Site-Selective Carbohydrate Binders. D. Kahne, *Chemistry & Biology* **1995**, 2, 7.

Glycosylation on the Merrifield Resin Using Anomeric Sulfoxides. L. Yan, C. Taylor, R. Goodnow and D. Kahne, *J. Am. Chem. Soc.* **1994**, 116, 6953.

Hydrogen Bonding in Micelle Formation. P. Venkatesan, Y. Cheng and D. Kahne, *J. Am. Chem. Soc.* **1994**, 116, 6955.

Use of Triethylene Glycol to Mimic Oligosaccharides: Design and Synthesis of a Ligand Based on Chromomycin A₃. D. Silva, C. Kraml and D. Kahne, *Bioorg. & Med. Chem.* **1994**, 2, 1251.

Analysis of Hydroxylamine Glycosidic Linkages: Structural Consequences of the NO Bond in Calicheamicin. S. Walker, V. Gupta, D. Gange and D. Kahne, *J. Am. Chem. Soc.* **1994**, 116, 3197.

Chromomycin A₃ as a Blueprint for Designed Metal Complexes. D. J. Silva, C. Kraml and D. Kahne, *J. Am. Chem. Soc.* **1994**, 116, 2641.

A Concise Synthesis of the Calicheamicin Oligosaccharide Using the Sulfoxide Glycosylation Method. S. Kim, D. Augeri, D. Yang and D. Kahne, *J. Am. Chem. Soc.* **1994**, 116, 1766.

Isomorphous Binding of Mercury-Substituted Thiosaccharides to Pertussis Toxin Crystals Yields Crystallographic Phases. R. Shigeta, Jr., K. Forest, L. Yan, D. Kahne and C. Schutt, *Acta Cryst.* **1994**, D50, 71.

NMR Characterization of Calicheamicin γ_1^I Bound to DNA. S. Walker, A. Andreotti and D. Kahne, *Tetrahedron* **1994**, 50, 1351.

Studies of the 2:1 Chromomycin A₃-Mg²⁺ Complex in Methanol: Role of the Carbohydrates in Complex Formation. D. Silva and D. Kahne, *J. Am. Chem. Soc.* **1993**, 115, 7962.

Structural Characterization of a Calicheamicin-DNA Complex by NMR. S. Walker, J. Murnick and D. Kahne, *J. Am. Chem. Soc.* **1993**, 115, 7954.

The Effect of Glycosylation on Peptide Backbone Conformation. A. Andreotti and D. Kahne, *J. Am. Chem. Soc.* **1993**, 115, 3352.

A One Step Synthesis of the Ciclamycin Trisaccharide. S. Raghavan and D. Kahne, *J. Am. Chem. Soc.* **1993**, 115, 1580.

The Sugars in Chromomycin A₃ Stabilize the Mg²⁺ Dimer Complex. D. Silva, R. Goodnow, Jr. and D. Kahne, *Biochemistry* **1993**, 32, 463.

Direct Introduction of CH₂OH by Intermolecular Trapping of CO. V. Gupta and D. Kahne, *Tetrahedron Letters* **1993**, 34, 591.

Facial Amphiphiles. Y. Cheng, D. Ho, C. Gottlieb, M. Bruck and D. Kahne, *J. Am. Chem. Soc.* **1992**, 114, 7319.

Cleavage Behavior of Calicheamicin γ_1^I and Calicheamicin T. S. Walker, R. Landovitz, W. Ding, G. Ellestad and D. Kahne, *Proc. Natl. Acad. Sci. USA* **1992**, 89, 4608.

Conformational Analysis of the N-O Bond in the Calicheamicin Oligosaccharide. S. Walker, D. Yang, D. Gange and D. Kahne, *J. Am. Chem. Soc.* **1991**, *113*, 4716.

Construction of Glycosidic N-O Linkages in Oligosaccharides. D. Yang, S. Kim and D. Kahne, *J. Am. Chem. Soc.* **1991**, *113*, 4715.

Sugars as DNA Binders: A Comment on the Calicheamicin Oligosaccharide. S. Walker, K. Valentine and D. Kahne, *J. Am. Chem. Soc.* **1990**, *112*, 6428.

Preparation of the 4-Ethylamino Sugar of Calicheamicin: Assignment of Absolute Configuration. D. Kahne, D. Yang and M. Lee, *Tetrahedron Letters* **1990**, *31*, 21.

Glycosylation of Unreactive Substrates. D. Kahne, S. Walker, Y. Cheng and D. Van Engen, *J. Am. Chem. Soc.* **1989**, *111*, 6881.

The Use of Alkoxy-Substituted Anomeric Radicals for the Construction of β -Glycosides. D. Kahne, D. Yang, J. Lim, R. Miller and E. Paguaga, *J. Am. Chem. Soc.* **1988**, *110*, 8716.

Efficient Regio- and Stereocontrolled Synthesis of Highly Functionalized Polycyclic Systems Using the Diels-Alder Addition of Stannyl-Substituted Vinylketeneacetals. G. Stork and D. Kahne, *Israel Journal of Chemistry* **1989**, *29*, 243.

Hydrolysis of a Peptide Bond in Neutral Water. D. Kahne and W. Still, *J. Am. Chem. Soc.* **1988**, *110*, 7529.

Substituent Effects on the Stereochemistry of Substituted Cyclohexanone Dimethylhydrazone Alkylations. An X-ray Crystal Structure of the Lithiated Cyclohexanone Dimethylhydrazone. D. Collum, D. Kahne, S. Gut, R. DePue, F. Mohamadi, R. Wanat, J. Clardy and G. Van Duyne, *J. Am. Chem. Soc.* **1984**, *106*, 4865.

Stereocontrol in Homogeneous Catalytic Hydrogenation via Hydroxyl Group Coordination. G. Stork and D. Kahne, *J. Am. Chem. Soc.* **1983**, *105*, 1072.

Kinetic Cyanations of Ketone Enolates. D. Kahne and D. Collum, *Tetrahedron Letters* **1981**, *22*, 5011.

Sodium Permeability and Myocardial Resistance to Cell Swelling During Metabolic Blockade. M. Pine, D. Kahne, B. Jaski, C. Apstein, K. Thorp and W. Abelmann, *Am. J. Physiol. (Heart Circ. Physiol. 8)* **1980**, *239*, H31.